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(12) UK Patent Application (19) GB (11)

2 135 332 A

(43) Application published 30 Aug 1984

(21) Application No 8404234

(22) Date of filing 17 Feb 1984

(30) Priority data

(31) 468120

(32) 18 Feb 1983

(33) US

(71) Applicants  
Johnson & Johnson Baby Products Company,  
(USA-New Jersey),  
One Johnson & Johnson Plaza,  
New Brunswick,  
New Jersey 08933-7003,  
United States of America

(72) Inventors  
Robert J. Verdichio  
Diane L. Spilatro

(74) Agent and/or Address for Service  
Carpmaels & Ransford,  
43 Bloomsbury Square,  
London WC1A 2RA

(51) INTCL<sup>3</sup>  
C11D3/48

(52) Domestic classification  
C5D 6A5C 6B10B 6B11A 6B12A 6B12B1 6B12F1 6B12F2  
6B12G4 6B12G6 6B12H 6B12K2 6B12K3 6B12L 6B12N4  
6B12N5 6B13 6B16B2 6B4 6B6 6C8

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GB 1401089  
GB 1111708  
GB 1078075

(58) Field of search  
C5D

(54) Detergent compositions

(57) This invention relates to detergent compositions comprising at least one anionic or amphoteric surfactant, at least one water-soluble nitrogen-containing polymer and a water-soluble, non-particulate substance (e.g. an antidandruff agent, an insecticide or a sunscreen agent) capable of imparting a desired residual effect to a specific substrate such as the scalp or skin.

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## SPECIFICATION

## Detergent compositions

- 5 The present invention relates to detergent compositions. More particularly, this invention relates to shampoo and/or other detergent compositions containing specific antimicrobial agents including anti-dandruff agents and/or sunscreen agents having improved activity. This invention also relates to compositions containing insecticide agents.

- Various substances having antimicrobial and anti-dandruff properties as well as substances having suncreening properties are well-known in the art and have been incorporated in detergent compositions in general and in particular in shampoo compositions. The activity of these substances in detergent compositions appears to be due in part to the fact that they are deposited on the hair and scalp surfaces or skin surfaces and are retained thereon through the rinsing step. It has generally been found, however, that only a relatively small proportion of such substances present in the detergent compositions actually deposit on the washed surface and survive the rinsing operation.

- Since sustained activity of these substances is in part a function of the quantity of the substance deposited and retained, measures which enhance deposition or promote retention will permit either reduction of the quantity of the substance required to attain a given level of activity or will increase the activity attainable using a given concentration of such substance.

- U.S. Patent No. 3,580,853 discloses detergent compositions containing water-insoluble, particulate substances, such as antimicrobial agents, and certain cationic polymers which serve to enhance the deposition and retention of the particulate, water-insoluble substances on surfaces washed with the detergent composition. The substances disclosed in this patent include antimicrobial agents and sunscreens are all particulate in nature having a particle size of from about 0.2 to about 50 microns and are all water-insoluble or sparingly soluble substances. When these substances are utilized in shampoo formulations, the resulting product would be opaque in appearance due to their particulate nature. In many instances such an opaque product is not as aesthetically appealing to the consumer as a clear product.
- 50 Further, the presence of these substances in particulate form often necessitates the addition of stabilizers to the formulation and these are usually clays which add "dirt" to the formulation thereby decreasing its cleansing ability. Another problem with the use of water-insoluble particulate substances in shampoo formulations is the potential of said substances to lodge in the eye thereby causing irritation and possible damage to the eye. The use of soluble, non-particulate substances as antimicrobial agents, 60 sunscreen agents or insecticide agents is not contemplated in this prior art teaching.

It is an object of this invention to provide improved

detergent compositions.

- It is a further object of this invention to provide 65 detergent compositions with improved antimicrobial and anti-dandruff properties.

It is a still further object of this invention to provide detergent compositions with improved sunscreen properties.

- 70 It is another object of this invention to provide improved insecticide compositions.

These and other objects of this invention will be set forth in or be apparent from the following detailed description of the invention.

- 75 The foregoing objects and other features and advantages of the present invention are achieved by detergent compositions comprising at least one surfactant, at least one water-soluble nitrogen-containing polymer and a water-soluble, non-particulate substance capable of imparting a desired residual effect to a specific substrate such as the scalp or skin. The balance of the compositions can comprise various cleansing adjuncts, fillers, carriers and the like which are well-known in the art.

- 85 The surfactants which are useful in the detergent compositions of the present invention include specific anionic and amphoteric surfactants. Specific non-ionic and cationic surfactants may also be used in conjunction with the anionic and amphoteric surfactants.

- 90 The anionic surfactants which are useful in the compositions of the present invention include a) alkyl sulfates of the formula



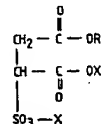
- b) alkyl ether sulfates of the formula



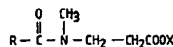
- 95 c)  $\alpha$ -olefin sulfonates of the formula



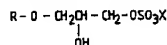
- d) alkyl sulfosuccinates of the formula



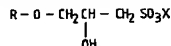
- e) alkyl sarcosinates of the formula



- f) alkyl monoglyceride sulfates of the formula



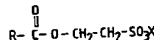
- g) alkyl monoglyceride sulfonates of the formula



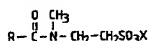
h) alkyl benzene sulfonates of the formula



i) acyl isethionates of the formula



j) acyl methyl taurides of the formula



wherein in all of the above R is alkyl of from 8 to 18 carbon atoms and mixtures thereof, X is a water-soluble cation such as sodium, potassium, hydrogen and the like, and n is an integer of from 1 to 5.

The anionic surfactants are useful in the compositions of the present invention in an amount of from about 2 to 20% by weight of the total composition, preferably from about 3 to 7%.

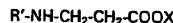
The amphoteric surfactants which are useful in the compositions of the present invention include betaines, sultaines, phosphobetaines, phosphitaines, n-alkylamino propionates, n-alkylimino dipropionates and imidazolines.

The betaine, and sultaine surfactants useful in this invention are described in U.S. Patent No. 3,950,417, which is incorporated herein by reference. The phosphobetaines and phosphitaines useful in this invention are described in U.S. Patent Nos. 4,215,064 and 4,261,911 which are incorporated herein by reference. The n-alkylamino propionates and n-alkylimino dipropionates are sold under the trade-name Deriphats by General Mills. The imidazolines which are useful in the compositions of this invention are described in U.S. Patent No. 2,970,160 which is incorporated herein by reference.

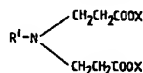
The preferred betaine amphoteric surfactants include the alkylbetaines such as cocodimethylcarboxymethylbetaine, lauryldimethylcarboxymethylbetaine, lauryldimethylcarboxyethylbetaine, cetyl-dimethylcarboxymethylbetaine, lauryl-bis-(2-hydroxyethyl) carboxymethylbetaine, oleyldimethyl-  
30 gamma-carboxypropylbetaine, lauryl-bis-(2-hydroxypropyl)-carboxyethylbetaine, and the like; the sultaines such as cocodimethylpropylsultaine, stearyldimethylpropylsultaine, laurylbis-(2-hydroxyethyl) propylsultaine and the like; and the  
40 aminosultaines such as cocoamidodimethylpropylsultaine, stearylamidodimethylpropylsultaine, laurylamido-bis-(2-hydroxyethyl) propylsultaine, and the like.

The preferred phosphobetaines include lauric  
45 myristic amido 3-hydroxypropyl phosphobetaine, cocamidodisodium 3-hydroxypropyl phosphobetaine, lauric myristic amido disodium 3-hydroxypropyl phosphobetaine, lauric myristic amido glyceryl phosphobetaine, lauric myristic amido carboxy disodium 3-hydroxypropyl phosphobetaine  
50 and the like. The preferred phosphitaines include cocoamidopropyl monosodium phosphitaine, lauric myristic amido propyl monosodium phosphitaine and the like.

55 The preferred n-alkylamino propionates and n-alkylimino dipropionates include those of the following structures:



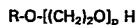
and



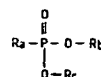
wherein R' is from about 8 to 22 carbon atoms and mixtures thereof and X is as previously defined.

60 The amphoteric surfactants are useful in the compositions of the present invention in an amount of from about 2 to 20% by weight of the total composition, preferably from about 3 to 5%. If  
65 mixtures of anionic and amphoteric surfactants are utilized the total amount of such surfactant mixtures utilized should not exceed about 20% by weight of the total composition.

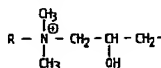
If desired, nonionic surfactants such as the reaction product of a sorbitan monolaurate or a sorbitan monococate with 20 to 80 moles of ethylene oxide and the ethoxylated fatty alcohols of the following  
70 formula



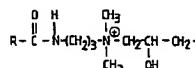
75 wherein R is as previously defined and mixtures thereof and p is an integer of from 10 to 50; or cationic surfactants such as phosphotriesters of the formula



wherein R<sub>a</sub>, R<sub>b</sub>, and R<sub>c</sub> are the same and are selected from the groups consisting of



80 and



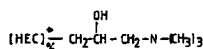
wherein R is as previously defined.

The nonionic surfactants, if utilized, can be present in an amount of from about 0 to 20% by weight of the total composition and the cationic surfactants, if  
85 utilized, can be present in an amount of from about 0 to 5% by weight of the total composition.

As hereinbefore indicated, the compositions of this invention contain as an essential component a water-soluble nitrogen containing polymer. Among  
90 the water-soluble nitrogen containing polymers that have been found useful are the cationic water-soluble quaternary nitrogen-substituted cellulose ether derivatives and the anionic water-soluble nitrogen containing free sulfonic acid polymers.

95 The cationic water-soluble quaternary nitrogen-

- substituted cellulose ether derivatives which are useful are those such as the polymer formed by reacting a hydroxyethylcellulose (having a degree of substitution with hydroxy-ethyl groups of 1.3) with the reaction product of 0.7 mole of epichlorohydrin and 0.7 mole of trimethylamine, per substituted anhydroglucose unit thereof, said polymer having a cationic charge density of .002 and a molecular weight within the range from about 200,000 to 230,000. This polymer has the structural formula:

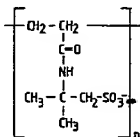


### Hydroxyethylcellulose

- Hydroxyethylcellulose is, of course, comprised of hydroxyethyl - substituted anhydroglucose units with varying degrees of hydroxyethyl substitution. This material is prepared by reacting alkaline cellulose with ethylene oxide as is more fully described by Gloor et al., Ind. Eng. Chem., 42:2150 (1950). The extent of substitution with the quaternary nitrogen-containing group must be sufficient to provide a cationic charge density greater than .001, and the molecular weight of the substituted hydroxyethylcellulose polymer must be within the range from about 2,000 to 3,000,000.

- The preferred cellulose ether derivatives from which the quaternary ammonium-substituted polymers described above are prepared include those which are water-soluble nonionic lower alkyl or hydroxyalkyl substituted. Such derivatives include methylcellulose, ethylcellulose, and hydroxyethylcellulose. A particularly efficacious quaternary ammonium substituted cellulose ether derivative for the purpose of this invention is available from Union Carbide under the tradename Polymer JR. This polymer has a molecular weight within the range from 100,000 to 1,000,000 and a cationic charge density of .005. These polymers are disclosed in U.S. Patent No. 3,580,853, discussed above.

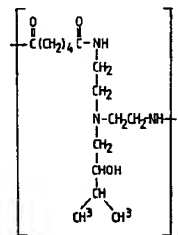
- The anionic water-soluble nitrogen containing free sulfonic acid polymers which are useful are polyacrylamidomethylpropane sulfonic acids of the following formula



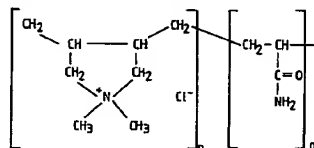
- A particularly useful compound is available from Henkel under the tradename Cosmedia Polymer HSP-1180. This compound is a viscous clear liquid with a viscosity of 200,000 cps. and is prepared as a 15% active in water. This compound has an average molecular weight of about 500,000.

- The water-soluble nitrogen-containing polymers can be employed herein at a concentration within the range of from about 0.05 to 1.00% by weight of the total compositions, preferably from about 0.1 to 0.3% Other cationic water-soluble, nitrogen-containing

polymers useful in the present invention include:  
a) an adipic acid/dimethylamino hydroxypropyl diethylenetriamine copolymer of the structure



- 55 These polymers are available from Sandoz under the tradename Cartaretin and have an average molecular weight of about 10,000.  
b) an acrylamide copolymer of the structure:



- These polymers are available from Merck & Co. under the tradename Merquat and have an average molecular weight of 500,000.

- c) quaternary ammonium polymers formed by the reaction product of dimethyl sulfate and a copolymer of vinyl pyrrolidone and dimethylaminoethylmethacrylate. These polymers are available from GAF under the tradename GAFQUAT.

- Water-soluble, non-particulate substances which can be utilized in the detergent compositions of this invention include water-soluble antidandruff agents, sunscreens, insecticides and conditioning and emolliency agents. All of these substances depend on deposition and retention on the hair, scalp and/or skin to produce their desired effects.

- Water-soluble, non-particulate antidandruff substances whose deposition and retention is enhanced by the water-soluble, nitrogen containing polymers described herein include

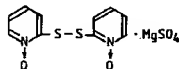
(a) 1 - hydroxy - 2 - pyridones of the formula



- wherein R<sub>1</sub> is hydrogen, alkyl of 1 to 17 carbon atoms, alkenyl of 2 to 17 carbon atoms, cycloalkyl of 5 to 8 carbon atoms, bicycloalkyl of 7 to 9 carbon atoms, cycloalkyl-alkyl of 1 to 4 alkyl carbon atoms, the cycloalkyl groups being optionally substituted by alkyl groups of 1 to 4 carbon atoms, aryl, aralkyl of 1 to 4 alkyl carbon atoms, aryl-alkenyl of 2 to 4 alkenyl carbon atoms, aryloxy-alkyl or arylthio-alkyl of 1 to 4 alkyl carbon atoms, benzhydryl, phenylsulfonyl-alkyl of 1 to 4 alkyl carbon atoms, furyl or furyl-alkenyl of 2

to 4 alkenyl carbon atoms, the aryl groups being optionally substituted by alkyl of 1 to 4 carbon atoms, by alkoxy of 1 to 4 carbon atoms, by nitro, cyano or halogen atoms.  $R_2$  is hydrogen, alkyl of 1 to 4 carbon atoms, alkenyl or alkynyl of 2 to 4 carbon atoms, halogen atoms or benzyl,  $R_3$  is hydrogen, alkyl of 1 to 4 carbon atoms or phenyl, and  $R_4$  is hydrogen, alkyl of 1 to 4 carbon atoms, alkenyl of 2 to 4 carbon atoms, methoxy-methyl, halogen or benzyl, and/or salts thereof.

These compounds are disclosed and more fully described in U.S. Patent No. 4,185,106 and such compounds are available commercially from Hoechst Aktiengesellschaft under the tradename Octopirox. (b) magnesium sulfate adducts of 2,2'-dithio-bis(pyridine-1-oxide) of the formula



These compounds are available from Olin Corporation under the tradename Omadine MDS.

Other water-soluble non-particulate substances which can be utilized in the present invention include sunscreen agents such as para-amino benzoic acid; and insecticides such as pyrethrin, piperonyl butoxide and mixtures thereof.

The water-soluble, non-particulate substances can be utilized herein within the range of from about 0.1 to 5.0% by weight of the total composition, preferably from about 0.1 to 2.0%.

In addition to the above ingredients, other ingredients conventionally added to detergent compositions for personal use such as dyes, preservatives, perfumes, thickeners, opacifiers, conditioners, emollients, buffering agents and the like, may be added in minor amounts. Ingredients such as dyes, preservatives and perfumes together usually constitute less than 2% by weight of the total composition. The pH of the compositions of this invention is preferably in the range of about 6 to 8.

While applicants do not wish to be bound by the following explanation, it is believed that the unexpected enhanced deposition and retention of the water-soluble non-particulate substances by the water-soluble nitrogen-containing polymers is as a result of coacervation and the formulation of a complex coacervate. This coacervate consists of a basically neutral macromolecule formed by the water-soluble nitrogen-containing polymer/surfactant interaction as a result of changes in the electrokinetic effects brought about primarily by a lowering of the zeta potential of the system as a function of dilution and/or changes in pH. Said polymers and surfactant should be of different electrical charge prior to dilution and subsequent coacervate formation.

Specific embodiments of the detergent compositions prepared in accordance with the present invention are illustrated by the following representative examples. It will be understood, however, that the invention is not confined to the specific limitations set forth in the individual examples, but rather to the scope of the appended claims.

#### EXAMPLE I

A low-irritating shampoo composition is prepared as follows.

Four grams of Polymer JR are dissolved in 400 grams of deionized water and heated until clear. The following are then added in order, 113.6 grams of a 44% active cocoamido sultaine, 156.3 grams of a 32% active tridecyl alcohol (4.2) ether sodium sulfate, and 166.7 grams of a 72% active polyoxyethylene sorbitan monolaurate followed by 13.0 grams of polyethylene glycol (150) distearate and the mixture is heated until homogeneous. After cooling to 35°C, 10 grams of Omadine MDS are added and mixed until in solution. The pH is adjusted to 6.0 to 6.2 with dilute HCL. 1.0 gram of Dowicil 200 is then added with 3.0 grams of fragrance. Sufficient deionized water is added to bring the total batch weight to 1000 grams. The resulting formulation is a clear dandrifical shampoo of the following composition:

	WtWt% (active)
cocoamido hydroxypropyl sultaine	5.00
sodium salt of tridecylether (4.2) sulfate [TDES (4.2)]	5.00
polyoxyethylene (44) sorbitan monolaurate	12.00
Omadine MDS	1.00
polyoxyethylene glycol (150) distearate	1.30
Polymer JR	0.40
Dowicil 200 (Dow Chemical's tradename for the cis-isomer of 1-(3-chloroalkyl)-3,5,7-triaza-azoniaadamantine chloride)	0.10
fragrance	0.30
deionized water	q.s. to 100.00

#### EXAMPLE 2

A dandrifical detergent composition is prepared according to the process of example 1 and consists of the following ingredients:

	wt/wt%
cocoamidohydroxypropyl sultaine	5.00
TDES (4.2)	5.00
polyoxyethylene (44) sorbitan monolaurate	12.00
polyethylene glycol (150) distearate	1.30
Octopirox	1.00
Polymer JR	0.20
Dowicil 200	0.10
fragrance	0.50
deionized water	q.s. to 100

The pH of the composition is adjusted to 7.5 by the addition of 15% HCL.

#### EXAMPLE 3

A detergent composition is prepared according to the process of example 1 and consists of the following ingredients:

	wt/wt%
cocoamidohydroxypropyl sultaine	5.00
TDES (4.2)	5.00
polyoxyethylene (44) sorbitan monolaurate	12.00
polyethylene glycol (150) distearate	1.30
Octopirox	0.25
Polymer JR	0.40
Dowicil 200	0.10

fragrance 0.30  
deionized water q.s. to 100

The pH of the composition is adjusted to 7.2 by the addition of 15% HCl.

#### EXAMPLE IV-VI

The compositions of Examples I-III were evaluated for ocular irritation by the following modified Draize Test (J.H. et al., Toilet Goods Assn. No. 17, May 1952, No. 1, Proc. Sci. Sect.).

A 0.1 ml sample of a neutral composition under test is dropped into one eye of an albino rabbit, the other eye serving as a control. Six rabbits are employed for each composition. Observations are made after 1, 24, 48, 72 and 96 hours and 7 days after initial instillation;

Example	1hr	24hr	48hr	72hr	96hr	day 7	Rating
I	14.5	6.2	6.7	6.7	2.7	1.0	Slight Irritation
II	13.0	5.3	6.0	6.0	3.3	2.3	Slight Irritation
III	13.3	4.7	5.8	5.2	2.0	1.3	Slight Irritation

These results demonstrate that the compositions of Examples I, II and III are mild and present only a slight ocular irritation potential.

#### EXAMPLE VII

A shampoo composition is prepared as follows. Polymer JR is dissolved in 400g of water with heat and stirring. The cocoamidohydroxypropyl sultaine, TDES (4.2), polyoxyethylene (44) sorbitan monolaurate (minus 25g) and polyethylene glycol (150) distearate are added. The mixture is heated until the polyethylene glycol distearate is dissolved. The mixture is cooled and the pH is adjusted to 6.2 with 15% HCl. The Omadine MDS is added and the mixture is heated and stirred. The fragrance is mixed with the remaining 25g of polyoxyethylene (44) sorbitan monolaurate and added to the cooled solution and the dye is then added.

The resulting composition consists of the following ingredients:

Ingredients	wt/wt%
cocoamidohydroxypropyl sultaine	6.88
TDES (4.2)	5.00
polyoxyethylene (44) sorbitan monolaurate	16.67
polyethylene glycol (150) distearate	1.30
Omagine MDS	0.25
Polymer JR 400	0.40
Dowicil 200	0.10
fragrance	0.30
dye	0.17
deionized water	q.s. to 100

The pH is adjusted to 6.2 with 15% HCl.

#### EXAMPLE VIII

A shampoo composition is prepared according to the procedure of Example VII and consists of the following ingredients:

second and third instillations are made after the 24 and 48 hour readings. Results may vary from substantially no change or only a slight irritation in the appearance of the rabbit's eye after 7 days to severe irritation and/or complete corneal opacity. Ocular lesions are scored for the cornea, iris and conjunctiva with a higher number indicating greater ocular irritation and the scores are added to give a total numerical value for each reading for six rabbits and averaged. The averaged score is an indication of the irritation potential of the composition under test. Based on the averaged score, descriptive irritation evaluation may be given, e.g., none, slight, moderate severe, as the case may be.

The results are as follows:

Ingredients	wt/wt%
cocoamidohydroxypropyl sultaine	13.26
TDES (4.2)	19.73
polyoxyethylene (44) sorbitan monolaurate	9.01
polyethylene glycol (150) distearate	1.30
Omagine MDS	0.25
Polymer JR	0.60
deionized water	q.s. to 100.00

The pH is adjusted to 6.5 with 15% HCl.

#### EXAMPLE IX

A shampoo composition is prepared according to the procedure of Example VII and consists of the following ingredients:

Ingredients	wt/wt%
cocoamidohydroxypropyl sultaine	13.26
TDES (4.2)	10.73
polyoxyethylene (44) sorbitan monolaurate	9.01
polyethylene glycol (150) distearate	1.30
Omagine MDS	1.00
Polymer JR	0.60
deionized water	q.s. to 100.00

The pH is adjusted to 6.5 with 15% HCl.

When 150g of the above shampoo are diluted to 500g with deionized water and allowed to stand for about 10 minutes with occasional stirring upon dilution the Polymer JR separates as a gel and can be removed from the solution by centrifugation. After the gel is collected it is washed with deionized water and centrifuged twice. The gel is then analyzed by HPLC and found to contain 1136 ppm Omagine MDS. This dilution simulates in use dilution of the composition and shows that the Omagine MDS is retained in the polymer-surfactant coacervate.

#### EXAMPLES X and XI

The following formulations are prepared according

to the procedure of Example VII and contain the following ingredients

5		EXAMPLE	
		X	XI
		wt/wt%	
	cocoamido betaine	4.0	4.0
	amidohydroxypropyl phosphobetaine	1.0	1.0
10	TDES (4.2)	5.0	5.0
	polyoxyethylene (80) sorbitan laurate	3.0	3.0
	polyethylene glycol (150) distearate	0.5	0.5
	Polymer JR	0.4	0.4
	Dowicil 200	0.1	0.1
15	propylene glycol	2.3	2.3
	dyes & fragrance	0.4	0.4
	Omadine MDS	0.5	—
	Octopirox	—	0.25
	deionized water	q.s to 100 q.s. to 100	

20 The formulation of Example X is adjusted to a pH of 6.6 with dilute HCl. The composition is sparkling clear with a viscosity of about 800-900 cps.

25 The formulation of Example XI is adjusted to a pH of 8.0 with dilute NaOH. The product is sparkling clear. In vivo antidandruff test studies are conducted with the above formulations as follows:

Two groups of 8 people each who have dandruff are compared using each test shampoo twice weekly over a period of three weeks. A commercial non-dandruff shampoo is used to establish the baseline counts. The higher the corneocyte count the greater the scalp flaking and subsequent lack of dandruff control. Thus, counts are taken before and after shampoo treatment with the medicated test products. The after treatment counts are taken four days after shampooing. The results are as follows:

Example X			
40	Subject	Baseline Pre-Treatment	Post Treatment
	1	994,000	800,000
	2	597,000	326,000
	3	602,000	501,000
45	4	1,098,000	622,000
	5	947,000	776,000
	6	543,000	481,000
	7	765,000	655,000
	8	901,000	531,000

Example XI			
50	Subject	Baseline Pre-Treatment	Post Treatment
	1	554,000	510,000
	2	672,000	660,000
55	3	800,000	619,000
	4	541,000	406,000
	5	644,000	389,000
	6	580,000	493,000
	7	613,000	501,000
60	8	606,000	488,000

The compositions of Examples X and XI each show a significant corneocyte count reduction thereby indicating excellent anti-dandruff efficacy.

#### EXAMPLE XII

A shampoo composition is prepared as follows: 0.2 parts by weight of Polymer JR are dissolved in 40 parts by weight of deionized water with heat and stirring, then cooled to room temperature. 16.55 parts by weight of a premelted 40% monolauryl sodium sulfosuccinate, 6.25 parts by weight of a 24% lauric-myristic imidazoline, 0.5 parts by weight of a coconut acid, 3.0 parts by weight of polyethylene glycol (150) distearate and 3.0 parts by weight of sodium sulfate are charged into a vessel equipped with a stirrer and steam and heated to 70°C then cooled to room temperature. The mixture is slowly added to the Polymer JR solution with stirring at room temperature and 1.0 part by weight of thickener is added. The pH is adjusted to 6.5 with dilute HCl. The fragrance and dye are then added with agitation and the remaining deionized water is charged.

The resulting composition has the following formulation:

	wt/wt%
85	Omadine MDS 0.75
	lauric myristic imidazoline 1.50
	sodium lauryl sulfate 4.80
90	monolauryl sodium sulfosuccinate 4.80
	Polymer JR 0.20
	coconut acid 0.50
	polyethylene glycol 150 distearate 3.50
	Dowicil 200 0.10
95	ethylene diaminetetrasodiumacetate 0.20
	sodium sulfate 3.00
	Acrysol ICS (Rohm & Haas Tradename for an alkali-soluble acrylic polymer emulsion thickener) 0.60
	dye, fragrance 0.60
100	deionized water q.s. to 100.00

The pH is adjusted to 6.5 with dilute HCl.

#### EXAMPLE XIII

A shampoo composition containing a sunscreen agent is prepared according to the procedure of Example XII and has the following formulation:

	wt/wt%
105	tris-octadecylphosphotriester 0.50
	para-amino benzoic acid 1.00
	lauric myristic imidazoline 4.50
110	amidohydroxypropyl phosphobetaine 4.50
	amidoamine oxide 3.00
	Cosmedia HSP-1180 0.20
	Dowicil 200 0.10
	fragrance 0.60
115	deionized water q.s. to 100.00

#### EXAMPLE XIV

An anti-insecticide shampoo composition is prepared according to the procedure of Example XII and has the following formulation:

	wt/wt%
120	pyrethrins 1.0
	piperonyl butoxide 0.2
	lauric myristic imidazoline 4.5
	amidohydroxypropyl phosphobetaine 4.5
125	amidoamine oxide 2.0
	tris-octadecylphosphotriester 1.0
	Cosmedia HSP-1180 0.3
	Dowicil 200 0.1
	fragrance 0.6
130	deionized water q.s. to 100

**EXAMPLE XV**

A shampoo composition is prepared according to the procedure of Example VII and has the following formulation:

	wt/wt%
5 Octopirox	0.75
lauric myristic imidazoline	3.00
sodium lauryl sulfate	7.50
Merquat	2.00
10 coconut acid	3.00
Acrysol ICS	2.00
Dowicil 200	0.10
dye, fragrance	0.50
deionized water	q.s. to 100.00

15 The pH is adjusted to 8.0 with dilute sodium hydroxide.

**EXAMPLE XVI**

A shampoo composition is prepared according to the procedure of Example VII and has the following formulation:

	wt/wt%
20 Omadine MDS	1.00
lauric myristic imidazoline	3.00
sodium lauryl (3) ether sulfate	10.00
25 Cartaretin	1.00
hydroxypropyl methyl cellulose	1.50
Dowicil 200	0.10
dye, fragrance	0.25
deionized water	q.s. to 100.00

30 The pH is adjusted to 6.0 with dilute HCl.

**EXAMPLE XVII**

An insecticidal detergent composition is prepared according to the procedure of Example XII and has the following formulation:

	wt/wt%
piperonyl butoxide	0.01
pyrethrins	1.00
40 Gafquat	1.00
lauric myristic imidazoline	3.00
C <sub>12</sub> -C <sub>16</sub> olefin sulfonate	6.50
alkanolamide	0.30
Acrysol ICS	2.00
45 dye, fragrance	0.55
deionized water	q.s. to 100.00

The pH is adjusted to 6.2 with HCl.

**EXAMPLE XVIII**

A protective shampoo composition is prepared according to the procedure of Example XVI and has the following formulation:

	wt/wt%
55 lauric myristic imidazoline	1.50
sodium lauryl sulfate	4.80
monolauryl sulfosuccinate	4.80
Polymer JR	0.20
60 polyvinylpyrrolidone	1.00
coconut acid	0.50
polyethylene glycol (150) distearate	3.00
sodium sulfate	3.00
dye & fragrance	0.60
65 deionized water	q.s. to 100.00

The pH is adjusted to 7.0 with HCl.

While the present invention has been described and illustrated with reference to certain preferred embodiments thereof, those skilled in the art will appreciate that various modifications, changes, omissions and substitutions can be made without departing from the spirit of the invention. It is intended, therefore, that the invention be limited only by the scope of the appended claims.

**CLAIMS**

1. A detergent composition consisting essentially of

- a) at least one anionic or amphoteric surfactant;
- b) at least one water soluble nitrogen containing polymer; and
- c) at least one water-soluble non-particulate substance.

2. The composition of claim 1 wherein the anionic surfactant is selected from the group consisting of alkyl sulfates, alkyl ether sulfates,  $\alpha$ -olefin sulfonates, alkyl sulfosuccinates, alkyl sarcosinates, alkyl monoglyceride sulfates, alkyl monoglyceride sulfonates, alkyl benzene sulfonates, acyl isethionates and acyl methyl taurides.

3. The composition of claim 1 wherein the amphoteric surfactant is selected from the group consisting of betaines, sultaines, phosphobetaines, phosphitaines, n-alkylamino propionates, n-alkyliminodipropionates and imidazolines.

4. The composition of claim 2 wherein the anionic surfactant is sodium lauryl sulfate.

5. The composition of claim 3 wherein the amphoteric surfactant is lauric myristic imidazoline.

6. The composition of claim 1 wherein the surfactants are sodium lauryl sulfate and lauric myristic imidazoline.

7. The composition of any one of claims 1 to 6 wherein the surfactant is present from 2 to 20% by weight of the composition.

8. The composition of any one of claims 1 to 7 wherein the water-soluble nitrogen containing polymer is selected from the group consisting of quaternary nitrogen-substituted cellulose ether derivatives, nitrogen-containing free sulfonic acid polymers, adipic acid/dimethylaminohydroxypropyl diethylene-triamine copolymers, acrylamide copolymers, and quaternary ammonium polymers formed by the reaction product of dimethyl sulfate and a copolymer of vinyl pyrrolidone and dimethylaminoethylmethacrylate.

9. The composition of claim 8 wherein the water-soluble, nitrogen containing polymer is a quaternary nitrogen substituted cellulose ether derivative.

10. The composition of claim 8 wherein the water-soluble nitrogen containing polymer is a free sulfonic acid polymer.

11. The composition of any one of claims 1 to 10 wherein the water-soluble nitrogen containing polymer is present from 0.05 to 2.00% by weight of the total composition.

12. The composition of any one of claims 1 to 11 wherein the water-soluble non-particulate substance is selected from the group consisting of anti-dandruff agents, sunscreen agents and insecticides.



13. The composition of claim 12 wherein the antitarduff substance is selected from the group consisting of 1-hydroxy-2-pyridones and magnesium sulfate adducts of 2,2'-dithio-bis(pyridine-1-oxides).
14. The composition of claim 12 wherein the sunscreen agent is para-amino benzoic acid.
15. The composition of claim 12 wherein the insecticide is selected from the group consisting of pyrethrins, piperonyl butoxide and mixtures thereof.
16. The composition of any one of claims 1 to 15 wherein the water-soluble non-particulate substance is present in an amount from about 0.1 to 5.0% by weight of the total composition.
17. The composition of any one of claims 1 to 16 containing up to 20% by weight of the total composition of a non-ionic surfactant selected from the group consisting of the reaction product of sorbitan monolaurate with 20 to 80 moles of ethylene oxide, the reaction product of sorbitan monococate with 20 to 80 moles of ethylene oxide, and ethoxylated fatty alcohol.
18. The composition of any one of claims 1 to 17 containing up to 5% by weight of the total composition of a cationic phosphotriester surfactant.
19. A detergent composition substantially as hereinbefore described with reference to the Examples.